

1. An antenna, comprising:  
2 a first plurality of electrodes;  
a second plurality of electrodes; and  
4 a plurality of antenna pixels,  
each antenna pixel including an electrically tunable element and a control circuit,  
6 the control circuit being in electrical communication with a first electrode, a second  
electrode, and the tunable element,  
8 the first electrode being one of the first plurality of electrodes, the second  
electrode being one of the second plurality of electrodes,  
10 such that a tunable property of the tunable element is set to a predetermined value  
by a tuning electrical signal provided by the first electrode when a selection signal is  
12 provided to the control circuit by the second electrode.

2. The antenna of claim 1, wherein the plurality of antenna pixels is arranged  
2 in a pixel array, the pixel array having a plurality of pixel rows and a plurality of pixel  
columns,  
4 each of the first plurality of electrodes being in electrical communication with  
antenna pixels within a pixel column, and  
6 each of the second plurality of electrodes being in electrical communication with  
antenna pixels within a pixel row.

3. The antenna of claim 1, wherein the first plurality of electrodes and the  
2 second plurality of electrodes form a grid pattern of electrodes.

4. The antenna of claim 1, wherein the tunable property of the electrically  
2 tunable element is an electrical capacitance.

5. The antenna of claim 4, wherein the tunable element comprises a voltage  
2 tunable dielectric material.

6. The antenna of claim 1, wherein the control circuit includes an electronic  
2 switch, the electronic switch transmitting the tuning electric signal from the first  
electrode to the tunable element when the electronic switch receives the selection signal.

7. The antenna of claim 6, wherein the electronic switch is a transistor.

8. The antenna of claim 6, wherein the electronic switch is a field effect  
2 transistor having a gate in electrical communication with the second electrode, the  
selection signal being a gate voltage sufficient to turn on the field effect transistor.

9. The antenna of claim 1, wherein each antenna pixel includes a radiative  
2 element, the radiative frequency of the radiative element being correlated with the  
tunable property of the tunable element.

10. The antenna of claim 1, wherein each antenna pixel includes a radiative  
2 element, the radiative phase of the radiative element being correlated with the tunable  
property of the tunable element.

11. An antenna, comprising:  
2 a first plurality of electrodes;  
a second plurality of electrodes; and  
4 a plurality of antenna pixels,  
each antenna pixel having an electrically tunable element, and a control circuit in  
6 electrical communication with a first electrode from the first plurality of electrodes and  
with a second electrode from the second plurality of electrodes,  
8 the control circuit being operable to set an electrical property of the electrically  
tunable element to a value determined by a tuning electrical signal provided by the first  
10 electrode when a selection signal is provided by the second electrode.

12. The antenna of claim 11, wherein each electrode from the first plurality of  
2 electrodes is connected to a plurality of control circuits within a group of antenna pixels,  
antenna pixels within the group each being connected to a different electrode from the  
4 second plurality of electrodes.

13. The antenna of claim 11, wherein providing a selection signal to a selected  
2 electrode from the second plurality of electrodes selects a selected group of antenna  
pixels, the selected group of antenna pixels including antenna pixels in electrical  
4 communication with each of the first plurality of electrodes.

14. The antenna of claim 11, wherein the plurality of antenna pixels are  
2 arranged within a pixel array, each of the first plurality of electrodes being connected to a  
row of antenna pixels within the pixel array, each of the second plurality of electrodes  
4 being connected to a column of antenna pixels within the pixel array.

15. The antenna of claim 11, wherein the electrical property is an electrical  
2 capacitance, the electrical capacitance being used to control a parameter of the antenna  
pixel, the parameter being chosen from a group consisting of radiative frequency of the  
4 antenna pixel, radiative phase of the antenna pixel, reflectivity of the antenna pixel, and  
connection status between the antenna pixel and another antenna pixel.

16. The antenna of claim 11, further comprising matrix addressing circuitry  
2 operable to control an antenna parameter, the antenna parameter being chosen from a  
group consisting of antenna radiative direction, antenna reception direction, and antenna  
4 reflection direction.

17. An antenna comprising a plurality of antenna pixels, each antenna pixel  
2 having:

an electrically tunable element;  
4 a radiative element; and  
an electronic switch providing electrical communication between a first switch  
6 terminal and a second switch terminal when a selection signal is received by the  
electronic switch,  
8 the first switch terminal being electrically connected to a first electrode, the  
second switch terminal being electrically connected to the electrically tunable element,  
10 the selection signal being provided by a second electrode,  
such that the electrically tunable element is electrically controlled by a tuning  
12 electrical signal provided through the first electrode when the selection signal is provided  
to the electronic switch through the second electrode.

18. The antenna of claim 17, wherein the first electrode in electrical  
2 communication with a first plurality of antenna pixels, the second electrode is electrical  
communication with a second plurality of antenna pixels, there being only one antenna  
4 pixel in common between the first and second pluralities of antenna pixels.

19. The antenna of claim 17, wherein the antenna pixels are arranged within  
2 an array of antenna pixels,  
the antenna further comprising a plurality of row electrodes, each row electrode  
4 being in electrical communication with antenna pixels within one row of antenna pixels,  
and a plurality of column electrodes, each column electrode being in electrical  
6 communication with antenna pixels within one column of antenna pixels, the first  
electrode being a column electrode and the second electrode being a row electrode.

20. The antenna of claim 19, further comprising a row selection electronic  
2 circuit operable to provide selection signals to a selected row electrode, so as to provide a  
selected row of antenna pixels; and

4           a column addressing electronic circuit operable to provide tuning electrical signals  
through the column electrodes to electrically tunable elements of antenna pixels within  
6   the selected row of antenna pixels.

21.    The antenna of claim 17, wherein the electrically tunable element is a  
2   voltage tunable capacitor.

22.    The antenna of claim 21, wherein the voltage tunable capacitor includes a  
2   voltage tunable dielectric material.

23.    The antenna of claim 22, wherein the voltage tunable dielectric material  
2   includes a ferroelectric material.

24.    The antenna of claim 22, wherein the voltage tunable dielectric material  
2   includes an oxide.

25.    The antenna of claim 22, wherein the voltage tunable dielectric material  
2   includes a titanate.

26.    The antenna of claim 17, wherein the electrically tunable element is used  
2   to modify at least one antenna pixel parameter, the antenna pixel parameter being chosen  
from a group of antenna pixel parameters consisting of: radiated frequency, radiated  
4   phase relative to a radio-frequency input, radiated phase relative to another antenna pixel,  
and connection status relative to another antenna pixel.

27.    The antenna of claim 17, wherein the electronic switch is a transistor, and  
2   the selection signal is provided to a base or gate of the transistor.

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28. The antenna of claim 17, wherein the plurality of antenna pixels is  
2 arranged in a pixel array having rows and columns, each antenna pixel being part of one  
row and one column.

29. The antenna of claim 21, wherein the voltage tunable capacitor is a P-N or  
2 P-I-N junction devices.

30. The antenna of claim 21, wherein the voltage tunable capacitor is an MOS  
2 capacitor or MOSFET.